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A Quality Improvement Project to Improve Type 2 Diabetes Mellitus Screening in Asian
Americans Using Body Mass Index Cut Point of 23

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Abstract

Background: Asian Americans are at a higher risk for Type II Diabetes than other groups and disproportionately develop Type II Diabetes Mellitus at younger ages, although having a lower Body Mass Index (BMI) compared to non-Hispanic whites. The prevalence of diabetes in Asian Americans is 9% in New York City; however, 50% of Asian Americans go undiagnosed.

Methods: A group of 22 Nurse Practitioners (NP) in New York were presented an evidence-based educational intervention along with a five-item pre-test and post-test to determine if they had acquired new knowledge on the issue. A follow-up survey was conducted to test if the intervention changed individual NP practice in screening Asian Americans in adult primary care clinics.

Results: The overall mean improvement in knowledge was 59.1%. The post-test showed that 72.7 % of the nurse practitioners gained the knowledge that 23 Kg/m² is the BMI cut point that should be used for screening Asian Americans. Although fourteen nurse practitioners (63.6%) were aware that obesity is a risk, nine (31.8%) identified Asian Americans as having a higher risk of developing diabetes at lower BMI's, with six (27.27%) aware of the recommended BMI cut point of 23 Kg/m². The follow-up survey indicated an increase in the number of Asian Americans screened using BMI of 23.

Conclusions: Improving knowledge of nurse practitioners will increase early diagnosis, treatment of Type 2 diabetes in Asian Americans and ultimately, enhance the quality of life for this population. Utilizing an Asian-specific BMI in the Electronic Health Record system will prompt providers to use the correct BMI and manage appropriately.

Keywords: Type 2 Diabetes Mellitus, Asian Americans, screening, body mass index, BMI, health disparity, ethnic-specific

A Quality Improvement Project to Improve Type 2 Diabetes Mellitus Screening in Asian
Americans Using Body Mass Index Cut Point of 23

Introduction

Type 2 Diabetes Mellitus is a significant public health problem. In the United States (U.S.) 29.1 million, (9.3%) adults are burdened with Type 2 Diabetes, and its consequences (American Diabetes Association [ADA]; 2016; Centers for Disease Control and Prevention [CDC], 2015). One person is diagnosed with diabetes every 23 seconds (ADA, 2016). If this trend continues, one in three adults in the U.S. will be affected by this chronic disease by 2050 (ADA, 2016). Asian Americans are at a higher risk for Type II Diabetes than other groups. The risk of developing diabetes is 1.2 times higher in Asian Americans compared to non-Hispanic whites (ADA, 2016). Asian Americans disproportionately develop Type II Diabetes Mellitus at younger ages, and at lower Body Mass Index (BMI) compared to non-Hispanic whites (Hsu, Arnetta, Alka, Chiang, & Fujimoto, 2015; Selph, Dana, Bougatsos, Patel, & Chou, 2015).

The increased predisposition to develop diabetes in Asian Americans is a health disparity. The cause of the health disparity is attributed to genetic and environmental factors (Hsu, Arnetta, Alka, Chiang, & Fujimoto, 2015). In 2015, the ADA issued a position statement emphasizing the physiological differences and the higher prevalence of diabetes at a lower BMI in Asian Americans. Based on this scientific evidence, the BMI cut point for defining overweight for Asian Americans was lowered from 25 Kg/ m² to 23 Kg/ m² (ADA, 2015). Adopting the proposed evidence-based practice guidelines to start screening Asian Americans at 23 Kg/ m² will increase early detection and diagnosis of diabetes. The early detection and timely management of the risk factors and diabetes will improve the quality of care, and enhance the quality of life for this population.

Background

Type 2 Diabetes Mellitus (T2DM) is defined as “a metabolic disorder of abnormal glucose metabolism with insulin deficiency and insulin resistance. It is a heterogeneous group of disorders characterized by hyperglycemia and glucose intolerance” (National Library of Medicine [NLM], Medical Subject Headings [MeSH], 2017). Type 2 Diabetes Mellitus (T2DM), and diabetes have been interchangeably used in this paper. Often, signs and symptoms of diabetes are not evident for several years. Additionally, the blood sugar level may not be high enough to meet the diagnostic criteria for diabetes. Many individuals with diabetes may remain undiagnosed, with nine out of ten Americans unaware that they have the disease (National Center for Chronic Disease Prevention and Health Promotion, Division of Diabetes Translation, 2016). The potential for multi-system complications and morbidity increases unless they are diagnosed early.

Some of the complications of diabetes include chronic kidney disease, heart disease, stroke, blindness, hearing loss, dementia, and depression. Diabetes is the primary cause of kidney failure and non-traumatic lower limb amputations (ADA, 2016; McCulloch & Hayward, 2017; Selph et al., 2015; Siu, 2015; Shah & Kanaya, 2014; the United States Preventive Services Task Force [USPSTF], 2016). The hospitalization rates for heart attacks were 1.8 times higher, and deaths from cardiovascular diseases were 1.7 times higher in individuals diagnosed with diabetes compared to persons without the disease in 2003 to 2006 (ADA, 2016). This life-long disease is also unfavorably associated with decreased work productivity and increased absenteeism. It can eventually affect employment and the quality of life of the individual (McCulloch & Hayward, 2017).

The total cost of diabetes care in the U.S. was \$245 billion in 2012 (ADA,2016). The cost had increased by 41% from 2007 to 2012 (ADA, 2016; Khan, Tsipas, & Wozniak, 2016; McCulloch & Hayward, 2017). Of the total cost of diabetes care in this country, \$69 billion was related to decreased productivity (ADA, 2016). The average medical expenses are 2.3 times higher for a person with diabetes compared to without diabetes. The expenses will continue to escalate without adequate public health measures to curb the growing trend of diabetes. It is also a tremendous socio-economic burden for the individual, family, community, and the society.

The prevalence of diabetes in Asian Americans is 9%, and 7.6% in non-Hispanic whites (ADA, 2016). Approximately 39.7% of Asian Americans with diabetes are undiagnosed (ADA, 2016). It is estimated that 50% of Asian Americans are unaware that they have diabetes (CDC, 2016). Asian Americans have the highest ratio of undiagnosed diabetes among all the ethnic or racial groups (ADA, 2016; CDC, 2016).

Asian Americans are individuals living in the U.S, who have their ancestral origins in any of the original peoples of the Far East, Southeast Asia or the Indian subcontinent (U.S. Census Bureau, 2012). There are 14.7 million Asians in America according to the 2010 census. They constitute 4.8% of the U.S. population (U.S. Census Bureau, 2012). They are a heterogeneous group of people, although they have been considered as one group. The culture, religious beliefs, socio-economic status, education, health practices, dietary habits, and lifestyles are very different (Staimez, Weber, Narayan, & Oza-Frank, 2013; U.S. Department of Health & Human Services [DHHS], National Institute of Health [NIH], 2016). Asian Americans are the fastest-growing ethnically diverse population in the U.S. (CDC, 2008). Asian Americans will comprise 10% of the U.S. population by 2050 (CDC, 2008; U.S. Census Bureau, 2012). There is insufficient data

about Asian Americans as they are underrepresented in the studies, and aggregated into one group (Selph et al., 2015).

Primary care providers provide preventive care services. Primary prevention involves identification of a risk factor or problem, and intervention before the occurrence of adverse health effects. Overweight and obesity are risk factors closely linked to diabetes, hypertension, and cardiovascular diseases (ADA, 2015; CDC, 2016). During preventive care visits, height and weight measurements are taken and used to calculate BMI.

Body Mass Index is defined as “an index of body density determined by the relationship of body weight to body height” (NLM, MeSH, 2017). It is a non-invasive surrogate of fat measurement. Measuring BMI is straightforward, objective and cost-efficient. The weight categories are used to guide management decisions, monitor outcomes of lifestyle interventions and treatment (USPSTF, 2012; World Health Organization, [WHO], 2004). Table 1. depicts the standard BMI categories for the general population, and the current revised criteria for Asians Americans (ADA, 2015).

Table 1
Standard BMI and Ethnic-Specific BMI for Asian Americans

| <u>Weight Category</u> | <u>General Population Standard BMI Cut-off</u> | <u>Asian American BMI Cut-off</u> |
|------------------------|--|---------------------------------------|
| Underweight | Below 18.5 kg/m ² | Below 18.5 kg/m ² |
| Healthy weight | 18.5 -24.9 kg/m ² | 18.5 – 22.9 kg/m ² |
| Overweight | 25.0 -29.9 kg/m ² | ≥ 23 - 24.9 kg/m² |
| Obese | ≥ 29.9 kg/m ² | ≥ 25kg/m² |

(ADA, 2015; NLM, 2017)

As Asian Americans develop diabetes at lower BMI because of their body and fat composition, use of the standard BMI to screen Asian Americans with a higher risk for diabetes

is a gap in the evidence-based practice (ADA, 2015). Adopting the Asian-specific BMI cut-off point of $\geq 23 \text{ kg/m}^2$ to initiate screening and testing will enable early identification of diabetes in the at-risk Asian Americans (ADA, 2015; CDC, 2016; Siu, 2015; Tung, Baig, Huang, Laiteerapong, & Chua, 2016). Early identification of the problem, and initiating lifestyle modifications can delay or prevent potential complications, and decrease morbidity from diabetes in Asian Americans (ADA, 2016; CDC, 2015; Mainous, Tanner, & Baker, 2016; Selph et al., 2015; Siu, 2015; USPSTF, 2016).

Problem Statement

Asian Americans disproportionately develop diabetes at younger ages, and lower BMI, progressing through the natural course of the disease at earlier stages at a faster pace (Becerra & Becerra, 2015; CDC, 2016; USPSTF, 2016; WHO, 2004). Use of the incorrect BMI category to screen Asian Americans with a higher risk of developing diabetes causes a delay in detection, diagnosis, increased morbidity and results from a lack of ethnic-specific screening knowledge.

Organizational “Gap” Analysis

In New York City (NYC), there are 1.1 million Asian Americans (U.S. Census Bureau, 2012). The prevalence of diabetes in adults in NYC is 9% (CDC, 2015). The standard or traditional BMI categories used for the general population is inappropriate to screen Asian Americans with a higher risk for diabetes (Hsu et al., 2015). Utilizing the higher BMI threshold of 25 kg/m^2 , instead of the recommended BMI of 23 kg/m^2 would miss identifying 36% of Asian Americans with diabetes (Araneta et al., 2015; Hsu et al., 2015). Evidence has suggested that Asian Americans are the least likely racial/ethnic minority group to obtain the recommended screening for diabetes (Tung et al., 2016). Therefore, using incorrect BMI cut point for screening can increase healthcare disparity and negatively affect the quality of care. Lack of

knowledge among the healthcare providers may be one reason for the healthcare disparity.

Educating nurse practitioners working in primary care clinics in NYC can increase screening of Asian Americans.

Review of the Literature

Methods

The search included the electronic databases of the Cumulative Index to Nursing Research and Allied Health Literature (CINAHL), PubMed of the NLM, National Guideline Clearinghouse of Agency for Healthcare Research and Quality (AHRQ), Cochrane Library, and Google Scholar. Other literature that was searched online included the ADA, the CDC, U.S. Census Bureau, and WHO. The reference list of the citations from the PubMed and CINAHL articles were also searched manually. The key search words were *Type 2 Diabetes Mellitus*, *Asian Americans*, and *screening*.

Selection Criteria

Inclusion criteria consisted of systematic reviews, meta-analysis, random controlled trials (RCTs), reviews, and full-text articles published in English from 2010 to 2017. A landmark article by WHO from 2004 is included in the review. The exclusion criteria consisted of articles related to Type 1 Diabetes, Gestational Diabetes, Cancer, abstracts, and editorials. Duplicate articles from PubMed search were excluded. Each article was reviewed for relevancy regarding topic and content.

The search in PubMed resulted in 16 articles, and CINAHL resulted in 16 articles. Included are one prospective longitudinal study, one meta-analysis, seven systematic reviews, three cross-sectional studies, one comprehensive review of the literature, three surveys, two clinical practice guidelines, and one standard of medical care. The review of the literature

included the highest levels of evidence research, based on The Johns Hopkins Nursing Evidence-based Practice Rating Scale (Newhouse, Dearholt, Pugh, & White, 2005). The review is organized following the themes: screening and current recommendations, health disparity in Asian Americans, healthcare disparity, facilitators and barriers to diabetes management, and provider knowledge.

Current Recommendations for Screening Asian Americans

The ADA recommends blood glucose screening of asymptomatic Asian Americans at the BMI of $\geq 23 \text{ kg/m}^2$ for earlier detection of diabetes (ADA, 2015). The USPSTF guidelines have a grade B recommendation to evaluate risk for obesity-related illnesses and diabetes in adults over 18 (Hsu et al., 2015; Selph et al., 2015). A grade B recommendation further means that there is a high certainty of a moderate benefit from using the evidence-based guidelines (USPSTF, 2016).

The guidelines encourage routine screening to identify individuals with risk factors for developing diabetes. Overweight, obesity, increased abdominal fat, unhealthy diet, physical inactivity, and smoking are risk factors for developing diabetes (USPSTF, 2016). Lifestyle changes can modify these risk factors. A family history of diabetes and Asian race/ethnicity are non-modifiable risk factors (Hsu et al., 2015). The findings by the WHO (2004) expert consultant group, suggest that Asians have different associations between BMI and percentage of body weight. Consequently, the health risks are higher for Asians compared to non-Hispanic whites at the equivalent BMI.

The risk for diabetes increases by 84% with each eleven-pound weight gain in Asian Americans compared to Europeans. The BMI was below 25 Kg/m^2 in Asians with diabetes. BMI of 25 Kg/m^2 is categorized as overweight for the general population. However, scientific

evidence showed a higher incidence and prevalence of diabetes in Asians at a lower BMI. Based on the evidence, the cut-off point for the overweight category was lowered to 23 Kg/ m² for Asians (ADA, 2015). In 2015, the ADA issued a position statement to use the lower BMI threshold with a cutoff point of 23 to screen Asian Americans based on the robust research findings (Hsu et al., 2015).

Findings from 16 RCTs included in the systematic review by Selph et al. (2015) for the USPSTF (2016) showed that early detection and treatment delayed or prevented the progression of diabetes and long-term complications (Hsu et al., 2015; Selph et al., 2015). The findings from a meta-analysis of ten studies by Selph et al. (2015), showed a substantial benefit from screening for abnormal blood glucose. Li et al. (2014) conducted a RCT in China. The subjects in the study were overweight, with a mean BMI of 25.8 Kg/m², and impaired glucose tolerance. They were followed up for 23 years. This study revealed that the risk of all-cause mortality reduced by 29% from lifestyle modifications for over six years (Selph et al., 2015). The Anglo-Danish-Dutch-study of Intensive Treatment in People with Screen Detected Diabetes in Primary Care in the United Kingdom was examined and showed no differences in mortality between screened and unscreened persons (Selph et al., 2015).

In summary, the robust evidence from the systematic review by (Selph et al., 2015) suggests that early detection of risk factors and abnormal blood glucose would delay and or prevent the development of diabetes in combination with lifestyle interventions for persons in the unhealthy weight range (Selph et al., 2015). Lifestyle interventions can decrease the risk of complications from diabetes by 58% (Selph et al., 2015).

Health Disparity in Asian Americans

Health disparity is defined by the CDC (2017) as a difference in the incidence, prevalence, mortality, and adverse clinical outcomes prevalent in specific population groups. Asian Americans have higher rates of cardiovascular diseases, hypertension, and Type 2 Diabetes Mellitus (CDC, 2017). There is substantial evidence that at the same BMI, Asians have higher risks of hypertension, cardiovascular disease, and cardiovascular deaths (Harvard T.H. Chan School of Public Health, 2016). The prevalence of diabetes was found to be higher in Asian Americans (Araneta, et al., 2015; Kanaya, et al., 2010). Consolidated data of 1,663 Asian Americans adults by Araneta et al. (2015) indicate that the age-adjusted prevalence of diabetes was 16.9 %. In another study by Kanaya et al. (2010) the age-adjusted prevalence of diabetes in Asian Americans was 23%.

The exact cause of the inherent susceptibility to diabetes and cardiovascular diseases in Asians is not entirely understood. The etiology of diabetes in Asian Americans is thought to be multifactorial. It is due to a combination of genetic, physiological differences, environmental, and lifestyle factors (Bakker et al., 2013). People of Asian descent have less muscle and more visceral fat. This fat is deep within the body enfolded around the organs. The visceral fat is more insulin resistant, and atherogenic (Bakker et al., 2013, WHO, 2004). Asian Americans have about 3-5% more total body fat at the same BMI compared to non-Hispanic whites (Harvard T.H. Chan School of Public Health, 2016). The amount, distribution, and type of body fat is attributed to the increased predisposition to diabetes (ADA, 2015, Araneta et al., 2015; Bakker et al., 2013; Hsu et al., 2015; Unnikrishnan et al., 2014).

The characteristics of the health disparity in Asian Americans is referred to by the term “Asian Phenotype” (Unnikrishnan, Ranjit, & Viswanathan, 2014). The predominant features of

the “Asian Phenotype” are insulin resistance, hyperinsulinemia, abdominal or truncal adiposity, low high-density lipoprotein (HDL) cholesterol levels, elevated levels of small dense lipids, and high triglycerides. Patel et al. (2016) compared the cardio-metabolic profile of Asian Americans and non-Hispanic whites. In Asian Americans, low HDL, high triglycerides, and high blood sugar were found in the healthy BMI range of 18.5 to 24.9 Kg/m² compared to the other ethnic groups (Patel et al., 2016). This cardio-metabolic level in the healthy BMI range is a concerning risk factor in Asians.

The average age at diagnosis of diabetes for Asian Americans was 44.9 years compared to 55.4 years in non-Hispanic whites. The disease is diagnosed about ten years earlier in Asian Americans compared to non-Hispanic whites. The onset of diabetes at younger ages could mean longer duration of illness. Early onset of diabetes increases the risk of complications, morbidity, and mortality (Becerra & Becerra, 2015). The age of diagnosis does not reflect the actual age of the onset of the disease process (Becerra & Becerra, 2015). Microvascular complications such as retinopathy and neuropathy may be present at diagnosis. Asian Americans also have a higher rate of complications at the time of diagnosis compared to non-Hispanic whites (Shah & Kanaya, 2014). They have a higher incidence of retinopathy, and end-stage renal disease (Bakker, Sieddering, Schoones, Meinders, & Jazet, 2013).

Shah and Kanaya (2014) conducted a systematic review of the pathogenesis of diabetes in Asian Americans. According to this review, the predominant mechanism underlying the increased susceptibility to diabetes in Asian Americans was insulin resistance, and not beta cell function. The conclusions from the cross-sectional study by Kanaya et al. (2010) of two community cohorts studies suggested that Asian Americans have a physiological inability to compensate for higher glucose levels, in addition to insulin resistance.

Tillin et al. (2014) conducted a prospective longitudinal cohort study with a median follow-up of 19 years. This study suggested that diabetes was diagnosed in Asians at a considerably lower BMI compared to the general European population (Tillin et al., 2014). The incidence of diabetes was identified in Asians at BMI of 25.2 kg/m², African-Caribbeans at 27.2 kg/m², and 30 kg/m² in Europeans. Asians developed diabetes at the lowest mean BMI of 25.2 kg/m² which was considered to be equivalent to BMI of 30 kg/m² in Europeans.

A systematic review by Staimez, Weber, Narayan, and Oza-Frank (2013) summarized the results of 97 citations from 1988 to 2009. The study investigated the mean BMI, obesity, and prevalence of diabetes in Asian subgroups in the U.S of 32 to 4,245 subjects from 24 to 78 years of age. The results showed a wide BMI range in the Asian subgroups. The prevalence of obesity was 7.0% - 30.9% in Asian Indians, 2.2% - 28.0% in Chinese, 5.3% -15.6% in Vietnamese, and 10.0% - 18.1% in Filipinos. Asian Indians had the highest obesity rate. The data from the National Health and Nutritional Examination Survey (NHANES) in 2011-2012 showed that only 10.8 % of Asian Americans were obese. The prevalence of obesity was 34.9 % in the U.S. adult population. The lower obesity rate of 10.8% in Asians was because of the standard BMI of ≥ 30 kg/m² was used as the cut-off point for obesity in the survey.

According to the ADA (2016), 85.2% of persons with diabetes are overweight or obese. The studies support the findings that diabetes developed at significantly lower BMI in Asian Americans. The evidence from studies encourages screening of Asian Americans using the lower BMI threshold of 23 kg/m² (Araneta et al., 2015; Tillin et al., 2014). It is critical for providers to be aware of this health disparity, and screening recommendations while caring for Asian Americans.

Healthcare Disparity and Asian Americans

Healthcare disparity is defined as “differences in access to or availability of medical facilities or services” (NLM, MeSH, 2017). A difference in the quality of care received by Asian Americans who belong to a racial and ethnic minority group is a healthcare disparity. Asian Americans had less than 34% chance of receiving the recommended screening for diabetes compared to non-Hispanic whites between 2012 and 2014 (Tung et al., 2016). The findings suggest that inadequate screening might be contributing to the high prevalence of undiagnosed diabetes in Asian Americans. In this study, the Asian American subjects completed the recommended breast and colon cancer screening. The results were reviewed after controlling for patient satisfaction which is positively linked to higher compliance with physician recommendations and did not change substantially. The results suggest that this disparity was unrelated to patient attitudes towards screening. It is probable that these patients were unaware of their inherent susceptibility to diabetes, and did not request the provider for the recommended screening.

Lack of provider knowledge about the health disparity in Asian Americans and screening guidelines may be another reason for the lack of adherence to the evidence-based practice (ADA, 2015; Tung et al., 2016). It is critical for providers to be cognizant of the elevated risks, and health disparity in the ethnically diverse population. Increasing provider awareness can address the healthcare disparity.

Delay in diagnosis or undiagnosed diabetes increases the risk for complications. Results of the data from a health-screening program in Tokyo from April 1998-2006 was examined. The results suggested that individuals without prior cardiovascular disease and undiagnosed diabetes had higher levels of metabolic markers (Ohara, Inoue, Kashima, & Inoue, 2013). Persons with

undiagnosed diabetes had high blood pressure, lipids, and liver enzymes compared to those with diagnosed diabetes (Ohara, Inoue, Kashima, & Inoue, 2013). Evidence suggests that early intervention may delay the progression of diabetes in Asian Americans (Hopper et al., 2011; Hsu et al., 2015; Ohara et al., 2013; Selph et al., 2015). Implementing the current evidence-based recommendation to use the BMI cut-off point of $\geq 23 \text{ kg/m}^2$ can identify 80% of Asian Americans with undiagnosed T2DM (Araneta et al., 2015; Hsu et al., 2015). Use of incorrect BMI for screening Asian Americans results in a healthcare disparity.

Facilitators and Barriers to Diabetes Management

Health care providers need to be attentive to the barriers, and facilitators to provide culturally competent care for the racial and ethnic minorities. Culturally competent care is defined as “care that respects the diversity in the patient population, and cultural factors that can affect health and health care, such as language, communication styles, beliefs, attitudes, and behaviors” (AHRQ, 2016).

Hopper, Billah, Skiba, and Krum (2011) performed a meta-analysis of 10 prospective RCTs. The study explored whether diet, exercise, and medication reduced cardiovascular events and prediabetes in 23,152 subjects over a period of approximately 3.75 years. There was no difference in all-cause mortality and cardiovascular deaths. There was a significant reduction in fatal and non-fatal myocardial infarctions (MI). The study recommended initiation of lifestyle and pharmacological interventions to reduce MI (Hopper et al., 2011).

Hsai, Larivee, Cefalu, and Johnson (2015) conducted a cross-sectional study to estimate the screening practices for prediabetes and diabetes. The lowered BMI cut-off of 23 kg/m^2 was used in 341 Asians, 45 years and older. The sensitivity of screening test for prediabetes and

diabetes increased 25% by lowering the BMI screening threshold to 23 kg/m² (Araneta et al., 2015; Hsai et al., 2015).

Cultural beliefs and health practices can affect self-care and health outcomes. Tang et al. (2012), in a study of 75 self-identified Asian Indians or Pakistanis, demonstrated that Asians perceived their weight differently. Their perceptions did not correlate to their actual weight. Forty percent of overweight individuals and 12% of the obese individuals considered themselves to be of healthy weight or underweight. Only 48% of overweight persons and 82% of obese participants believed their weight adversely affected their health. A few individuals associated their weight with increased risk for chronic diseases. Asian Americans associated larger body size with good health and prosperity. Increasing patient and family's awareness of body weight and risk for diabetes can improve adherence to lifestyle interventions.

Provider Knowledge

Evidence suggests a need to increase primary care providers' knowledge about the current evidence-based practice for diabetes (Mainous et al., 2016; Vasudevan, Stotts, Anabor, & Mandayam, 2012). Data from the National Ambulatory Medical Care Survey of 518 encounters in a primary care clinic demonstrated that the health care providers did not follow the recommendations for diabetes management (Mainous et al., 2016). The Hemoglobin A1C was checked within 90 days of the encounter in the clinic. However, providers did not document the recommended care. Counseling for lifestyle modifications, or treatment for the 33.6% of the patients with prediabetes was not recorded. Lack of knowledge about the recommended care may have been a possible reason for the omission. In another study of 183 physicians surveyed in Houston, Texas, only 21% were aware of the modified ethnic-specific BMI criteria for Asian Americans (Vasudevan et al., 2012).

The barriers identified by patients in achieving expected health outcomes were lack of instruction from providers for a culturally tailored diabetic diet, and concerns about worsening health from exercise (Renzaho, Mellor, Boulton, & Swinburn, 2010; Sohal, Sohal, King-Shier, & Khan, 2015). Interventions for lifestyle change must be culture-specific. Providers need to be cognizant of these barriers while incorporating interventions in the management of diabetes. Interventions for lifestyle change must be culture-specific.

Health care providers also need to be updated about the changes in evidence-based practice. Implementing evidence-based practice can potentially reduce healthcare disparities. Three systematic reviews found that the provider's knowledge, communication skills, language, attitude, and beliefs could affect the care process in diabetes management (Nam, Chesla, Stotts, Kroon, & Janson, 2011).

The change in evidence-based practice to use BMI of 23 for screening will enable identification of more Asian Americans with undiagnosed diabetes. Reports from NHANES showed greater awareness of prediabetes, and increased counseling of patients lead to improvement in weight control, and increased physical activity (Okoson & Lyn, 2015). Initially, primary and secondary prevention efforts may result in additional costs. In the long run, however, these efforts will be beneficial to the patient and community by preventing complications and decreasing mortality. Decision support systems in the electronic health records (EHR) consistent with evidence-based practice can improve the quality of care in primary care practices (Zhang, Leuvan, & Neidlinger, 2012). Providers can positively affect the care and improve quality care outcomes.

Summary of Reviewed Studies

The results from all the studies consistently demonstrate the high incidence, and prevalence of diabetes in Asian Americans at younger ages and lower BMI. Asian Americans may appear to be thin, but they are metabolically obese. An Asian American and a non-Hispanic white with same BMI do not have the same risk profile because of the genetic differences, and fat composition. Asian Americans have a higher risk at the equivalent weight compared to a non-Hispanic white. The evidence from these studies provides a compelling reason to use the revised ethnic-specific BMI cut point of $\geq 23 \text{ mg/Kg m}^2$ for screening (ADA, 2015; USPSTF, 2016). Preventive measures such as earlier recognition and lifestyle interventions need to be started sooner, and not just at the time of diabetes diagnosis (ADA 2015). It is crucial to improve screening and increase early detection of diabetes in Asian Americans.

Evidence-Based Practice: Verification of Screening Using Ethnic-specific BMI for Asian Americans

The review of the highest level of evidence recommends the use of BMI cut point of 23 kg/m^2 for screening. The high sensitivity of 84.7% at $\text{BMI} \geq 23$ will improve identification of diabetes in Asian Americans (Araneta et al., 2015; Hsu et al., 2015; Selph et al., 2015; Shah & Kanaya, 2014). Screening Asian Americans using BMI cut-off point of ≥ 23 detected 80% of Asian Americans with undiagnosed diabetes. Utilizing BMI cut point of $\geq 25 \text{ mg/Kg m}^2$ would miss identifying 36% of Asian Americans with newly diagnosed diabetes (Araneta et al., 2015; Hsu et al., 2015). The change in the BMI categories was recommended based on the research findings that Asian Americans have an exceptionally higher risk of diabetes at lower BMI and younger ages because of physiological differences (ADA, 2015; Hsu et al., 2015; Selph et al., 2015; USPSTF, 2016).

Theoretical Framework

Kurt Lewin's Change theory (1951) was chosen as the theoretical framework for the project (Lewin, 1951). This theory was found to be appropriate for this project as the expected outcome was a change in individual nurse practitioner practice (see Appendix B). Change must be planned, purposeful, and deliberate to achieve the expected outcome. The change process can be affected by restraining and driving forces. The driving force can positively move the change in the expected direction. Negative forces can impede the change. A balance between the negative and positive forces must be maintained to sustain the change.

This theory has three stages: Unfreezing, Moving, and Refreezing. The change process involved creating the awareness and need to change a current situation to improve the quality of care. Unfreezing occurred when the gap in evidence-based practice was identified and acknowledged by the nurse practitioners. Additionally, they attended the educational session because of the felt need to update their knowledge. This change process was facilitated through the pre-test and the PowerPoint presentation. During the 'moving' stage, the change was initiated. The nurse practitioners gained the knowledge to make the necessary changes from the educational intervention. Acquiring the new knowledge set the stage for initiating the change in individual nurse practitioner practice behavior in their respective clinical areas. The 'refreezing' stage ensued when the acquired knowledge was incorporated into practice in the primary care clinics.

The positive driving force was the motivation and commitment of the nurse practitioners to provide quality care to the patients. Utilizing the new evidence-based recommendation to screen at 23 was another positive force. The negative forces included time constraints, system barriers, and resistance to change from the status quo. Increasing the knowledge about the health

disparity in Asians and the gap in evidence-based practice, minimized the resistance to change.

The last stage occurred when the change was integrated into practice. The educational intervention provided the nurse practitioners with a greater understanding of the system barriers.

They were able to recommend system-wide changes to eliminate barriers at the institutional level. They were provided with the resources to continue the quality improvement initiative to sustain the changes.

Goals, Objectives, and Outcomes

The overarching goal of this project was to educate a Nurse Practitioner (NP) group in New York City (NYC) on evidence-based guidelines to change individual practice related to Asian American screening using new body mass index (BMI) categories. The objectives and outcomes can be seen in Table 2.

Table 2

Objectives and Outcomes

| <u>Objectives</u> | <u>Expected Outcomes</u> |
|--|--|
| 1. The DNP student will educate a nurse practitioner group on the new evidence-based guidelines. | At least 20 nurse practitioners will attend the educational session. |
| 2. Nurse practitioners will demonstrate increased knowledge of risk factors and Asian-specific screening. | All the participants will answer the questions correctly on the post-test. |
| 3. Nurse practitioners will change individual practice related to Asian American screening using new BMI categories. | At one-month follow-up, 75% of the nurse practitioners will report using the new BMI categories, and screen using BMI cut point of 23. |

The stated objectives were accomplished. The educational program was offered to 22 nurse practitioners. The pre-test was completed before the presentation. The pre-test and post-test

were used to assess the knowledge before and after the program. The expected outcome was that 75% of the nurse practitioners who attended the program would complete the follow-up survey. Only 14 (63.6%) completed the written survey.

Project Design

A group of Nurse Practitioners (NP) in New York who meet regularly were presented an evidence-based educational intervention along with a five-item pre-test and post-test to determine if they had acquired new knowledge on the issue (ADA, 2015; USPSTF, 2016). A one month written qualitative follow up survey was conducted to test if the intervention changed individual NP practice in screening Asian Americans for Type II Diabetes Mellitus in the adult primary care clinics.

Project Site and Population. The project site was a public hospital in NYC. The population of interest for this project was the nurse practitioners who deliver healthcare services to the medically underserved urban community in NYC. The sample consisted of members belonging to the Nurse Practitioner Council who meet on a regular basis. At the request of the DNP student, chairperson of the Nurse Practitioner Council announced the proposed program by email. The group members were encouraged to attend the meeting, and participate in the educational presentation. Participants were recruited from the nurse practitioner council to attend the educational program. The participants volunteered to participate, and 22 nurse practitioners participated in the program. These providers screen, diagnose, and manage chronic diseases such as diabetes, hypertension, and cardiovascular diseases. The prevalence of diabetes in NYC adults is 9% (CDC, 2015). The targeted population is the Asian Americans in NYC. This ethnically diverse population most frequently have immigrated from the following countries; Afghanistan, Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Japan, Korea, Malaysia,

Maldives, Nepal, Pakistan, Philipines, Sri Lanka, Thailand, and Vietnam (Asian American Federation, 2012). About 70% of the Asian Americans are foreign-born with limited English proficiency (US DHHS; NIH, 2016).

Setting, Facilitators, and Barriers. The setting was the meeting room of the Nurse Practitioner Council. The stakeholders were the nurse practitioners who are members of the Council. A gap analysis revealed that the primary care providers have been using the conventional BMI criteria intended for screening of the general population, which is not ethnic-specific. Lack of awareness among providers about the current ethnic-specific guidelines for Asian Americans may be contributing to the gap in the evidence-based practice for Asian Americans.

One of the significant barriers to implementing the evidence-based practice is the standard BMI classification system and decision support in the HER. Currently, the BMI is calculated automatically in the EHR system based on the general population criteria. The decision support in the EHR is not consistent with the revised ADA guidelines for ethnic-specific screening. Automatic calculation of BMI based on ethnicity will eliminate a system barrier and increase provider adherence to the current screening guidelines. Additional barriers included the inability of the nurse practitioners to attend the educational session due to time constraints. Attendance at the meeting was low because the nurse practitioners had to arrange their schedule to participate in the program on their own time. The educational session was offered during the lunchtime, and food was provided.

Implementation

The implementation framework for this project was The Plan-Do-Study-Act (PDSA) Model by Edwards Deming (Joshi, Ransom, Nash, & Ransom, 2014, pp. 88-89). The emphasis

of the four phases of the PDSA cycle was to increase awareness of ethnic-specific BMI screening for Asian Americans among nurse practitioners who are primary care providers in the clinics.

The “Plan” involved the designing and implementation of the educational intervention for the nurse practitioners on evidence-based guidelines for screening Asian Americans. The expected outcome of the project was to increase the knowledge of nurse practitioners about the guidelines for screening Asian Americans. A one-month qualitative follow-up was planned to explore barriers to implementing the evidence-based guidelines and identify change in individual nurse practitioner practice.

The “Do” for the project was the implementation of the evidence-based educational intervention. The Institutional Review Board (IRB) of the University of Massachusetts (UMASS) reviewed the Human Subjects Determination form. The project was exempted from IRB approval (see Appendix E). Permission to conduct the presentation during the nurse practitioner meeting was obtained from the chairperson of the Nurse Practitioner Council. As requested by the DNP student, the chairperson of the Nurse practitioner Council emailed every member of the group in October 2017. A reminder email was sent on November 1, 2017, regarding the planned presentation during the regular monthly meeting. The DNP student developed, organized and conducted the PowerPoint presentation for 45 minutes in December 2017 (see Appendix H). A five-question pre-post test designed by the DNP student was used to assess the knowledge. Following the presentation, questions were answered. There was also a discussion about risk factors in Asians. The participants were very interested in the topic as a large percentage of their patients are Asian Americans.

The nurse practitioners completed the pre-test before the presentation. The post-test was completed at the conclusion of the session. Corresponding numbers were assigned to the pre and

post-tests to ensure anonymity of the nurse practitioners. A written follow-up survey was completed by the nurse practitioners in January 2018 (see Appendix D).

The “Study” phase included the data collection and analysis of the data. Descriptive statistics were used to analyze the data (see Table2).

The “Act” of this project was the dissemination of the findings. The DNP student has had informal discussions with the administration for improving the quality of care for Asian Americans. Results were presented at the nurse practitioner meeting in February 2018. The DNP student will also do a poster presentation during the Scholarship day at UMASS, Amherst on May 10, 2018.

Measurement Instruments

A five-question pre-post test developed by the DNP student was used to assess the knowledge (see Appendix C). One month after the educational presentation, a qualitative follow-up survey was conducted to identify barriers to implementing the guidelines.

Data Collection Procedures. The nurse practitioners completed the pre-test before the presentation. The post-test was completed after the presentation and question and answer session. A follow-up qualitative survey (see Appendix D) was completed by the nurse practitioners one month after the educational intervention. The nurse practitioners completed the written survey in January 2018 during the monthly Nurse Practitioner Council meeting.

Data Analysis. The data were compiled and reviewed. After double checking for errors; the data was entered into an Excel spreadsheet. Percentages and mean were calculated (Polit, 2010, pp. 169-178). The findings revealed that the objectives of the educational program had been achieved (see table 2, Appendix F and G for results).

Ethical Considerations/Protection of Human Subjects

The intervention in this quality improvement initiative was an educational presentation for nurse practitioners to increase screening of Asian Americans for the early diagnosis of diabetes. This educational intervention was intended to improve the quality of care by implementing the recommended evidence-based practice guidelines. The participants were nurse practitioners, and no identifying information was collected. No patient data was gathered. Numbers were assigned to identify pre- and post-tests. The Human Determination Form was submitted to the IRB of UMASS. The project was exempted from IRB review (see Appendix E).

Additionally, the DNP student followed the evidence-based guidelines during the presentation. The privacy of the nurse practitioners' responses on the pre and post-tests were protected. There was no potential risk to patients in this project, as there was no patient intervention. The collected data were kept in a locked filing cabinet in the DNP student's office, only accessible to the DNP student, the project coordinator. All electronic files containing identifiable information were password protected to prevent access by unauthorized users. Only the project coordinator had access to the passwords.

Results

The evidence-based educational intervention was offered to a group of 22 nurse practitioners who met every month in New York. The nurse practitioners had 5-20 years of experience. They worked in various areas: two in private practice, 15 in the hospital-based ambulatory clinic, four in the inpatient areas, and one in a community health center. They attended the educational program in November. A written follow-up survey was completed in January 2018. The project started in November 2017 and finished in January 2018 according to the projected timeline depicted in Table 1 (see Appendix A). Eight nurse practitioners were

unable to attend the meeting and complete the survey due to competing priorities and time constraints.

The nurse practitioners actively participated in the discussion, sharing their experiences of caring for Asian Americans. They remarked that they gained a greater understanding of the risk factors and guidelines for screening Asian Americans. They also realized the importance of earlier intervention at lower BMI cut points in the management of the disease, and need to change individual practice during their encounters with Asian American patients. At the conclusion of the program, the nurse practitioners felt that they would be able to increase their effort in screening. They were eager to increase screening, subsequently, decrease the number of undiagnosed Asian Americans patients with Type 2 Diabetes, and improve the quality of care.

Table 2 shows the pre and post-test scores of the educational intervention for screening Asian Americans and their risk status. The change in the scores was also calculated. Figure 1 is a bar graph, a comparison of pretest scores to the post-test scores for screening Asian Americans and their risk status.

Table 2

Descriptive Statistics of Pre/Post-test Scores of Educational Intervention for Screening Asian Americans and risk status

| Questions | Pre-Test (%) | Post Test % | Percent Change (%) |
|---|--------------|-------------|--------------------|
| 1. Higher risk status of Asian Americans | 31.8 | 100 | 68.2 |
| 2. Asian Americans develop diabetes at younger ages and lower BMI | 40.9 | 100 | 59.1 |
| 3. Overweight in Asian Americans is a risk factor for diabetes | 63.6 | 100 | 36.4 |
| 4. BMI cutoff point for Asian Americans is 23 kg/m² | 27.3 | 100 | 72.7 |
| 5. Decision support in EHR is specific for screening Asian specific | 40.9 | 100 | 59.1 |
| Mean | 40.9 | 100 | 59.1 |

Number of Nurse Practitioners = 22

The overall mean improvement in knowledge was 59.1%, and the post-test showed that 72.7 % of the nurse practitioners gained the knowledge regarding the main change in the guideline, the BMI cut point of 23 Kg/m² for screening Asian Americans. Although 14 (63.6%) were aware that obesity was a risk factor, only nine (31.8%) identified Asian Americans as having a higher risk of developing diabetes at lower BMI, with six (27.27%) aware of the specific BMI cut point of 23. Additionally, 13 (40.9%) of the nurse practitioners had not recognized that the decision support in the EHR system did not reflect the current evidence-based practice guidelines to use BMI of 23 for screening.

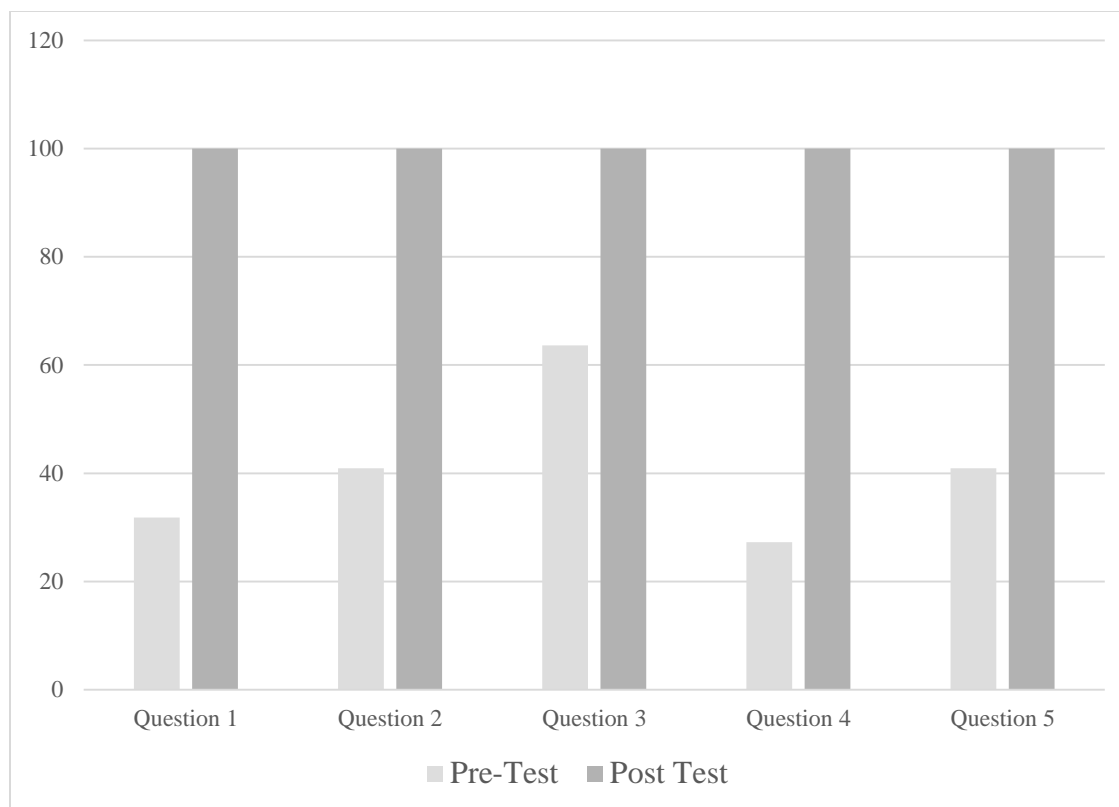


Figure 1. Comparison of Pretest vs. Post Test Scores for Risk Status and Screening of Asian Americans

Results of Follow-Up Survey

During the January 2018 monthly meeting, nurse practitioners completed the written post-presentation follow up survey. The date of the meeting was emailed to the group in advance, but only 14 members attended the meeting. The response rate for the one-month follow up was 14 (63.6 %). Table 3. presents the results of this follow-up survey.

Table 3

Descriptive Statistics of One month Post-Educational Follow up for Change in Individual Nurse Practitioner Practice in Primary Care Clinics

| <i>Questions</i> | <i>Yes (%)</i> | <i>No (%)</i> | <i>Change (%)</i> |
|--|----------------|---------------|-------------------|
| Using ADA guidelines for screening | 10 (71.4) | 4 (26.6) | 71.4 |
| NP's were aware of guidelines to use 23 kg/m² for screening | 7 (50.0) | 7 (50.0) | 59.1 |
| Presentation encouraged increased screening | 14 (100.0) | 0 (0) | 100.0 |
| Felt confident in recommending culture-specific dietary changes | 13 (92.9) | 1 (7.1) | 72.72 |
| Felt confident in educating patients about the increased risk of diabetes in Asian Americans | 13 (92.9) | 1 (7.1) | 92.9 |
| Mean | 92.9 | 7.1 | 92.9 |

Notes: *number of respondents* = 14

The nurse practitioners responses in the follow-up survey indicated an increase in the number of Asian Americans screened using BMI of 23 after attending the educational program. As per estimates of the nurse practitioners, ten increased screening by 35.7%, and four increased to 28.57%. The increase in screening suggests a change in individual nurse practitioner practice. The change in individual practice suggests that the knowledge acquired from the educational intervention was applied while caring for Asian American patients in the primary care clinics.

The one-month follow-up survey indicated that system barriers impeded the implementation of the screening guidelines (see Appendix G). The barriers reported by the nurse practitioners in the follow-up survey are similar to those barriers identified by the DNP student.

Discussion

Improving screening and early diagnosis of diabetes in Asian Americans is a critical need because of the growing epidemic of type 2 diabetes worldwide. Primary care providers are in a pivotal position to intensify screening efforts to address this public health problem. Nurse Practitioners who are primary care providers must be knowledgeable about the health disparity in Asian Americans, and the current evidence-based screening guidelines to impact a change (ADA, 2015). This project focused on improving the knowledge of nurse practitioners and changing individual nurse practitioner practice on the evidence-based-guidelines for screening Asian Americans in the primary care clinics.

The Lewin's Change Theory was utilized as the implementation framework for the project. Announcing the program and inviting the nurse practitioners to attend the program set the stage for learning and change. The nurse practitioners came for the program as the topic was necessary for their practice and of interest to the nurse practitioners who care for Asian Americans. The purpose of the educational intervention was to modify current thinking, and practice pattern related to screening Asian Americans. The responses in the pre-test showed that individual nurse practitioner practices of managing a slightly overweight varied. Three reported that they did nothing suggesting that they did not consider overweight as a risk factor. Nine nurse practitioners recommended lifestyle changes, nine screened for diabetes at BMI of 25, and one referred the patient to the primary care provider. The nurse practitioners recognized the need to change their practice and to start using the evidence based guideline for screening.

During the PowerPoint presentation, the participants mentioned that they had been wondering why so many of their Asian American patients were having diabetes at a very young age. They attributed the high prevalence of diabetes to the environmental influences like unhealthy diet, and lack of exercise and did not realize that there was a strong physiological problem. Although environment plays a strong role in the predisposition to diabetes, genetic factors were thought to be the underlying etiology (Harvard T.H. Chan School of Public Health, 2016). Gaining a deeper understanding of the genetic susceptibility was very important in the process of changing the screening practice.

The change was further facilitated through discussion. Nurse practitioners shared personal stories of friends who had been affected by diabetes at an early age. The DNP student shared a personal experience of family members, and friends affected by cardiovascular diseases and diabetes at a young age and lower BMI. The nurse practitioners suggested that patients should be educated to “decrease buying, preparing food at home, take lunch to work, and decrease snacking.” An Asian American patient with diabetes was advised by a nurse practitioner to take lunch, instead of eating fast food. The person hesitated to bring homemade food for fear of offending co-workers from the smell of the spicy food. It is challenging for the socio-culturally diverse Asian population to follow a healthy lifestyle while adapting to life in America (Hsu et al., 2015).

Patient barriers such as busy lifestyle, work, and cultural beliefs related to weight perception were identified as challenges for the nurse practitioners while caring for Asian American patients. Nurse Practitioners felt that culturally responsive care to the ethnically diverse population will improve health outcomes for Asians Americans (AHRQ, 2016).

The discussions and responses showed that the nurse practitioners were in the refreezing phase and had an understanding of the barriers associated with sustaining the change.

The analysis of the pre and posttests showed improvement in knowledge about the risk factors, and the Asian-specific screening guidelines. The first objective was to educate the group of nurse practitioners on the evidence based-guidelines for screening Asian Americans. The PowerPoint presentation was used to deliver the presentation. Evidence suggests that there is a need to increase primary care providers' knowledge about the current evidence-based practice about T2DM (Mainous et al., 2016; Vasudevan et al., 2012). The pre-test showed that only 27.3% were aware of the change in BMI guideline to use 23 Kg/m² for screening. The results of the follow-up survey showed that only 50% of the nurse practitioners were aware of the revised Asian-specific guidelines before the educational program. The expected outcomes of the quality improvement project were met.

Data from the National Ambulatory Medical Care Survey (2016) suggested that providers did not follow the recommended care for diabetes in a primary care clinic due to lack of knowledge (Mainous et al., 2016). Similar to the survey, the nurse practitioners also admitted that they were not aware of the health disparity in Asian Americans, and the ethnic-specific BMI category for Asian American patients.

The study by Tung et al.(2016) also showed that healthcare disparity prevailed while caring for Asian Americans. The chance of receiving the recommended screening for diabetes for Asian Americans was 34% lesser compared to non-Hispanic whites (Tung et al., 2016). As part of the follow-up survey, the nurse practitioners recommended that all providers should be educated about the revised screening guidelines. Cultural diversity including language, dietary practices were identified as patient barriers that need to be addressed by the healthcare system.

Providers felt the need to be sensitive to the patients' weight perceptions while recommending lifestyle changes (Becerra & Becerra, 2015). The findings were consistent with the findings that provider's knowledge, communication skills, language, attitude, and beliefs could affect the care process in diabetes management (Nam et al., 2011). Ferdinand & Nasser (2015) also recommended minimizing barriers to increase patient, family engagement to achieve positive health outcomes, and improve the quality of care.

The nurse practitioners pointed out that it was difficult to quickly determine a patient's ethnicity to use the cut point of 23 Kg/m². Many commented that including an Asian-specific BMI in the EHR system will prompt a provider to use the correct BMI given such barriers as a busy schedule, limited time, and rapid turnover of patients. The experiences of the nurse practitioners were similar to the study findings as indicated in the written follow up survey (Tang et al., 2012). As part of the follow-up survey, the nurse practitioners recommended that all providers should be educated about the revised guidelines. Providers may need more education to provide culturally responsive care to the ethnically diverse population (AHRQ, 2016). Cultural beliefs and health practices can affect patients' adherence to lifestyle changes. The nurse practitioners recommended the use of community advocates to increase patient and family awareness of the health disparity, and increase patient engagement in their care.

Limitations

This DNP project had several limitations. Only 14 (63.7%) of nurse practitioners completed the follow-up survey. The universal criterion for BMI calculation and decision support in the EHR system was identified as a significant barrier to implementing the guidelines to use 23 as cut point. The DNP student was not in a position to address this problem. The findings suggest that a long-term QI project with repeated PDSA cycles may be required.

Conclusion

All 22 nurse practitioners who participated in the educational intervention demonstrated a change in knowledge and achieved the desired outcome of increasing their understanding about Asian-specific screening. These participants provide primary care services in New York. Analysis of the post-test and survey responses suggest that the educational intervention accomplished the goal of raising awareness of the Asian-specific screening guidelines. The program also led to change in individual nurse practitioner screening practice using a lower BMI cutoff point of 23 Kg/ m². Gaining the awareness about the health disparity that Asian Americans disproportionately develop Type II Diabetes Mellitus at younger ages, and lower BMI compared to non-Hispanic whites will empower the nurse practitioners to be vigilant in screening using BMI of 23 for Asian Americans. The increase in early diagnosis and treatment of at-risk Asian Americans will decrease morbidity and complications from diabetes. The nurse practitioners can improve the quality of care by changing individual practice and contribute to changing the lives of the Asian Americans. The nurse practitioners can be change agents in their respective work areas.

This DNP project will improve the overall quality of care, reduce healthcare disparity and ultimately enhance the quality of life for this population. This quality improvement initiative can serve as a basis for increasing provider awareness of Asian specific guidelines. Public health campaigns, free screening, and more patient education may raise public awareness about the health disparity in Asian Americans. Opportunities to support culture-specific lifestyle changes and individual diabetes management among Asian Americans is another area that needs to be explored.

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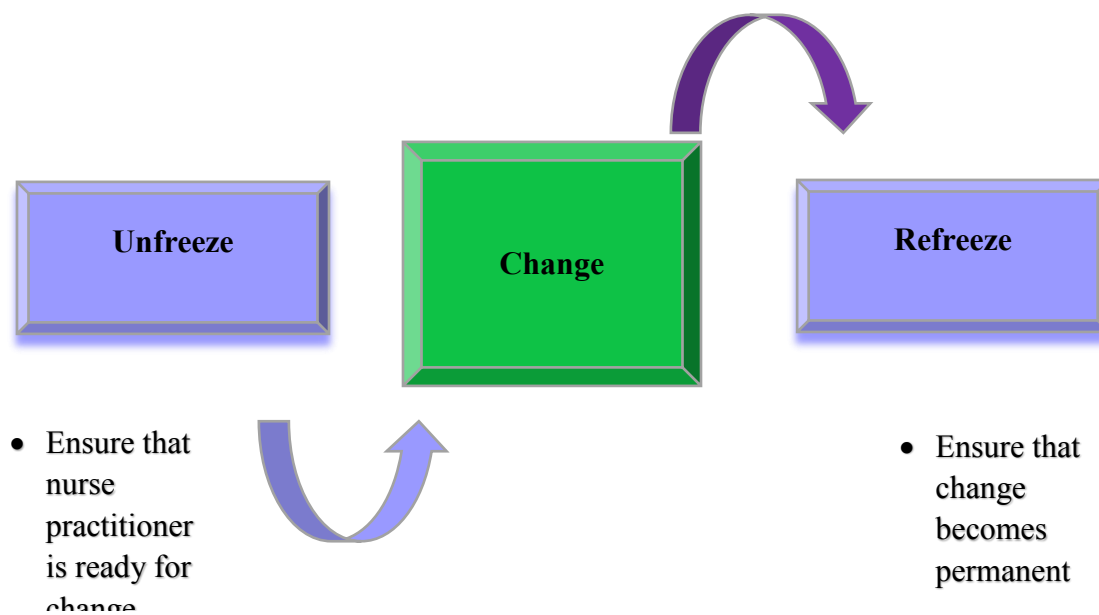
Appendix A

Table 2 Simplified Project Timeline

| Task | October 2017 | November 2017 | December 2017 | January 2018 | February 2018 | March 2018 |
|--|-----------------|------------------|------------------|-----------------|------------------|---------------|
| Write up of Proposal and Approval | X | | | | | |
| Educational intervention | | X | | | | |
| One month follow-up | | | X | | | |
| Analysis of outcomes | | | | X | | |
| Results presented to nurse practitioners | | | | | X | |
| Final Write-up | | | | | | X |

Appendix B

Theoretical Framework

Kurt Lewin's Model of Change

(Lewin, 1951)

Appendix C**Pre-test for Nurse Practitioners**

Participant code number:

Date:

1. Place of work:
 - a. Private practice
 - b. Hospital-based ambulatory clinic
 - c. Inpatient
 - d. Other Specify _____
2. **Years of Nurse Practitioner experience:**
 - a. 0-5
 - b. 6-10
 - c. 11-15
 - d. 16-20
 - e. over 20
3. **How many patients do you see in a day?**
 - a. 5-10
 - b. 11-15
 - c. 16-20
4. **How many Asian American patients do you see in a day?**
 - a. 0-5
 - b. 6-10
 - c. 11-15
 - d. 16-20
5. **What is your current practice when you see a slightly overweight young Asian adult with a family history of diabetes?**
 - a. Do nothing
 - b. Recommend lifestyle changes
 - c. Screen for Type 2 Diabetes Mellitus

Appendix C Pre-Test (Continued Page 2)

| # | <i>Question</i> | <i>Yes</i> | <i>No</i> |
|----------|--|------------|-----------|
| 1 | Asian Americans have a higher risk of developing Type 2 Diabetes Mellitus (T2DM) compared to non-Hispanic-whites | | |
| 2 | Asian Americans develop Diabetes at younger ages and lower body mass index | | |
| 3 | Overweight in Asian Americans considered a risk factor for T2DM | | |
| 4 | The Body Mass Index cutoff point for obesity in Asian Americans is 23 kg/m² | | |
| 5 | The decision support system in the electronic health record system is not tailored to reflect the current evidence-based practice related to Screening Asian Americans for Type 2 Diabetes | | |

Thank you for participating. I will be contacting you for the follow-up after a month.

Appendix C (Page 3)**Post-Test for Nurse Practitioners****Please complete****Participant code number:****Date:**

| # | Question | Yes | No |
|---|--|-----|----|
| 1 | Asian Americans have a higher risk of developing Type 2 Diabetes Mellitus (T2DM) compared to non-Hispanic-whites | | |
| 2 | Asian Americans develop diabetes at younger ages and lower body mass index | | |
| 3 | Overweight in Asian Americans considered a risk factor for diabetes | | |
| 4 | The Body Mass Index cutoff point for obesity in Asian Americans is 23kg/m² | | |
| 5 | The presentation increased knowledge about the new guidelines for screening Asian Americans? | | |
| 6 | Based on the presentation do you plan to implement any changes in your practice? If so, what are the changes | | |

Appendix D

One Month Follow-up of Survey Post-Educational Presentation

Number:

Date:

| # | Question | Yes | No |
|---|---|-----|----|
| 1 | Have you already been using the new ADA guideline to screen Asian Americans? | | |
| 2 | Were you aware that the ADA recommends screening of Asian Americans for diabetes at BMI cut point of 23 kg/m² ? | | |
| 3 | Do you feel that the presentation has encouraged you to increase screening of Asian Americans for diabetes | | |
| 4 | I feel confident in recommending culture-specific dietary changes for Asian Americans | | |
| 5 | I feel confident in educating patients about the increased risk of diabetes in Asian Americans | | |

6. The number of Asian Americans screened for diabetes increased by

- a. 0 -5
- b. 5 -10
- c. 10 -15
- d. 15 -20

7. Have you experienced any barriers to using the new BMI criteria to screen Asian Americans? If yes, what are the barriers? Explain

8. Give at least one recommendation to improve screening of Asian Americans?

Appendix E



University of Massachusetts Amherst
Human Research Protection Office
Mass Venture Center
100 Venture Way, Suite 116
Hadley, MA 01035

Office of Research Compliance
voice: (413) 545-3428
fax: (413) 577-1728

MEMORANDUM – Not Human Subject Research Determination

Date: July 27, 2017
To: Annie Samuel, Nursing

Project Title: A Quality Improvement Project to Improve Type 2 Diabetes Mellitus Screening in Asian Americans using Body Mass Index Cut Point of 23

IRB Number: 17-124

The Human Research Protection Office (HRPO) has evaluated the above named project and has made the following determination based on the information provided to our office:

- ☐ The proposed project does not involve research that obtains information about living individuals.
- ☐ The proposed project does not involve intervention or interaction with individuals OR does not use identifiable private information.
- ☒ The proposed project does not meet the definition of human subject research under federal regulations (45 CFR 46).

Submission of an IRB application to University of Massachusetts Amherst is not required.

Note: This determination applies only to the activities described in the submission. If there are changes to the activities described in this submission, please submit a new determination form to the HRPO.

Please do not hesitate to call us at 413-545-3428 or email humansubjects@ora.umass.edu if you have any questions.

A handwritten signature in cursive script that reads "Iris L. Jenkins".

Iris L. Jenkins, Assistant Director
Human Research Protection Office

Appendix F

RESULTS – Pre and Post-test

Descriptive Statistics of Pre/Post-test Score of Educational Intervention for Screening Asian Americans and risk status

| # | Question | Pre test Yes | Pre test No | change | Post test yes | Post test No |
|---|--|-----------------|----------------|--------|---------------------|--------------------|
| 1 | Asian Americans have a higher risk of developing Type 2 Diabetes Mellitus (T2DM) compared to non-Hispanic-whites | 7(31.82%) | 15(68.18%) | 68.18 | 22 | 0 |
| 2 | Asian Americans develop Diabetes at younger ages and lower body mass index | 9 (40.91%) | 13(59.10%) | 59.09 | 22 | 0 |
| 3 | Overweight in Asian Americans considered a risk factor for diabetes | 14 (63.64%) | 8(36.37%) | 36.36 | 22 | 0 |
| 4 | The Body Mass Index cutoff point for obesity in Asian Americans is 23 kg/m ² | 6 (27.27%) | 16 (72.73%) | 72.73 | 22 | 0 |
| 5 | The decision support system in the electronic health record system is not tailored to reflect the current evidence-based practice related to Screening Asian Americans for Type 2 Diabetes | 9(40.91%) | 13(59.10%) | 59.09 | 22 | 0 |

Appendix G

Results of One Month Post-Educational Presentation

Follow-up survey

Recommendation by Nurse Practitioners to Improve Screening of Asian Americans

1. Change EHR and BMI to 23. It needs to be ethnic-specific
2. Increase awareness of providers
3. The computer needs to be updated to reflect best practices
4. Our Computer system needs to be updated for ethnicity
5. To have providers screen all patients that fit the profile
6. Offer free screening
7. Community advocate
8. Community advocate
9. All providers not just NP's need classes on new guidelines.

Recommendations by Nurse Practitioners to Overcome Patient barriers

1. Offer health education for patients
2. Teach patient to decrease buying, make food, bring in lunch, and decrease snacking
3. Come up with another way for these individuals to see themselves at risk
4. Discuss individual types of foods eaten (cultural) and how it can be modified with healthy substitutes
5. . Cultural including language x 2 responses
6. Patient barriers- time management because of busy lifestyle, work
7. Patient not seeing themselves as overweight or at increased risk for T2DM

System Barriers Identified in Implementing Evidence-based Guidelines

1. BMI is calculated for all ethnicities based on a single criterion
2. Universal guideline BMI of 25 is used
3. Hard to get ethnicity information.
4. Nurse practitioners must remember to ask the ethnicity.
5. BMI is not synchronized with ethnicity in the computer
6. The computer is not up to date with new guidelines
7. Computer system only uses BMI cut point for the general population, and it looks like the nurse practitioner is treating the patients incorrectly with a lower BMI cut point
8. Limited time to apply all the teachings due to schedule
9. Rapid turnover - 20 patients per week

Appendix H

PowerPoint – Educational Presentation



Education
Presentationprimer.|